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EXAMINER

BUEKER, RICHARD R

ART UNIT PAPER NUMBER

1763

DATE MAILED: 09/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/408,921

Applicant(s)

RICCI ET AL.

Examiner

Richard Bueker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7,10-14,18,40 and 43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,10-14,18,40 and 43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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Claims 1, 2, 4-7, 10-14, 18, 40 and 43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claims 1 and 12, the phrase "wherein the portion of the gas distribution plate has substantially no micro-defects about 50 micrometers or greater" is not supported by the specification as filed.

Claims 1, 2, 4-7, 10-14, 18, 40 and 43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The phrase "micro-defects about 50 micrometers or greater" is not described by the specification as originally filed in such a way as to enable one skilled in the art to exactly how the term is defined or how to measure the micro-defects. It is noted that applicant's own declaration (filed July 7, 2003) only discusses the measurement of the particle size of particles after they are ejected from the surface of the GDP, and does not discuss measuring micro-defects. The specification at page 6, lines 8-9, refers to "micro-defects, e.g. microcracks in the range of 50 microns". Since "e.g." is defined as "for example", this sentence only gives one example of a micro-defect, and the specification does not include a comprehensive definition that would support the use of this phrase as a critical limitation on which to base patentability of the claims.

Claims 12-14, 18 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maydan (5,746,875) taken in view of Aihara I (U.S. 6,258,440) or Aihara II (JP 10-167859). Maydan discloses a plasma-based fabrication apparatus that includes a ceramic gas distribution plate (GDP) having a plurality of holes that supply plasma gases. Maydan's GDP has a machined surface. Maydan teaches that it should be pre-treated to reduce particulates but does not discuss annealing for reducing undesirable particulates. Aihara (I and II) teaches that a ceramic part having a machined surface that is intended to be used in a plasma based fabrication apparatus should be annealed after the ceramic part is machined. Aihara teaches that this annealing step will eliminate the undesirable particulates that are otherwise produced when the ceramic part is used in the plasma-based fabrication apparatus. Aihara specifically teaches (col. 5, line 9) that his annealing step is applicable to a shower plate, which is a GDP. Aihara's annealing temperature is within the range recited in applicants' claim 12 (see, for example, Invention Examples 3 and 4 at col. 6, lines 16-53 of Aihara). It would have been obvious to one skilled in the art to anneal the ceramic GDP of Maydan in the manner taught by Aihara, because Aihara teaches that his annealing process will help to eliminate the particles that that Maydan desires to eliminate.

Regarding the citation of both Aihara documents in the above rejection, it is noted that Aihara II (JP 10-167859) is the Japanese language priority document for Aihara I (U.S. 6,258,440). Aihara I has a typographical error at col. 7, line 34, in the section labeled "Invention Example 6", where the reference to "Comparative Example 1"

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should be "Comparative Example 2". The original Japanese language priority document (translation attached) makes this clear. Thus, it is clear that "Invention Example 6" of Aihara is directed to the Aluminum Nitride embodiment disclosed by Aihara. This is the reason for including a citation of JP 10-167859 in the rejection.

Claims 1, 2, 4-7, 10-14, 18, 40 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herchen (5,819,434) taken in view of Aihara I (6,258,440) or Aihara II (JP 10-167859). Herchen (see Figs. 3 and 4, and col.5, lines 11-18) discloses a ceramic GDP for use in a plasma-based fabrication apparatus, that is formed by machining, which includes a machined surface through which a plurality of holes pass. It would have been obvious to one skilled in the art to subject the ceramic GDP of Herchen to an annealing treatment after machining, as taught by Aihara I and II, for the desirable purpose of reducing the generation of particles when the GDP is used in a plasma-based fabrication apparatus. Regarding the recitation of drilled holes in claims 1 and 40, it is noted that this is a product-by-process limitation that is not structurally distinguishable from the holes of Herchen's GDP.

Claims 1, 2, 4-7, 10-11 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herchen (5,819,434) taken in view of Aihara I (6,258,440) or Aihara II (JP 10-167859) and in further view of Maydan (5,746,875) (col. 2, lines 3-4) and Chen (5,824,605) (col. 8, lines 8-17), who teach that it was conventional in the prior art to drill the gas distribution holes in a ceramic GDP. It would have been obvious to one skilled in the art to drill Herchen's holes, because Maydan and Chen teach that it was known in the art to form GDP holes by drilling.

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Claims 1, 2, 4-7, 10-14, 18, 40 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider (6,263,829) taken in view of Aihara I (6,258,440) or Aihara II (JP 10-167859). Schneider discloses a plasma-based fabrication apparatus having a plate shaped support 20 (Figs. 1-7) with gas distribution channels and orifices. The support 20 is properly considered a gas distribution plate, and it contains portions (insert 140) having a machined ceramic surface (col. 7, lines 10-51) in which insert 140 includes a drilled or machined orifice (col. 7, lines 49-51). Schneider teaches that it is more desirable to use monocrystalline ceramics for the insert 140 because polycrystalline ceramics cause more particulates in a plasma environment. Aihara, however, teaches that polycrystalline ceramics can be used for parts of a plasma apparatus without causing undesirable particulate contamination, if the polycrystalline ceramic material is annealed after machining. It would have been obvious to one skilled in the art to modify the apparatus of Schneider by using annealed polycrystalline ceramic inserts 140 in Schneider's gas distribution plate 20, because Aihara teaches that such an annealed insert will accomplish Schneider's purpose of avoiding particulate contamination.

Claims 1, 2, 4-7, 10-14, 18, 40 and 43 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wicker I (5,993,594). Wicker discloses a GDP made by hot pressing silicon nitride at a temperature above 1500° C (col. 7, lines 34-38). Wicker teaches (col. 3, lines 33-42) that his GDP results in much reduced particulate generation and much lower rate of chemical reaction with process gases. In view of the product-by-process nature of

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applicant's claims, the GDP of Wicker is prima facie not distinguishable from the presently claimed GDP.

Claims 1-14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wicker I (5,993,594) taken in view of Wicker II (5,863,376) and Chen (5,824,875) and optionally in further view of applicants' description of the prior art. Wicker I and II both disclose silicon nitride GDPs, which are sintered at high temperature during fabrication. Wicker II in particular teaches (col. 6, lines 62-65) that the holes can be provided in the green ceramic material prior to high temperature firing. Chen also teaches this (col. 8, lines 8-17), and he teaches that the holes can be provided by drilling. The step of shaping the green sheet is inherently a machining step prior to the high temperature sintering step and it would have been obvious to use the shaping steps described by Wicker II and Chen for the GDP of Wicker I.

Furthermore, applicants' description of the prior art discloses that it was a conventional practice in the prior art to season a GDP in a reactor for 10 hours (see last paragraph of page 2 of applicants' specification). It thus would have been obvious to one skilled in the art to season a GDP such as that of Wicker I or II or Chen in order to further reduce particulates if so desired. At page 6, lines 18-20, applicants indicate that a seasoned GDP does not contain micro-defects, and thus meets the presently recited limitation of "no micro-defects about 50 micrometers or greater". Applicants' product-by-process as presently written do not distinguish over such a seasoned prior art GDP in any discernable way. It is noted that seasoning by operating the processing chamber

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for 10 hours is a high temperature process, which inherently heats the GDP (see col. 6, lines 30-31 of Wicker II for example), at least to the extent recited in claim 3.

Applicants have argued that the high temperature sintering step of Wicker I and Wicker II should not be considered an annealing step as now claimed. It is noted, however, that the dictionary provides plural definitions for "anneal" (copy attached to this office action) including one relating to annealing glass, another relating to annealing metal, and another relating to annealing structural-clay products, which reads as "to process (structural-clay products) by slow cooling after subjection to heat in order to prevent checking, cracking and warping". It is not clear that Wicker's product can be distinguished from applicants' product-by-process claims by reciting an annealing step rather than a heating step.

Applicant's declaration has been considered but is not persuasive regarding the above stated rejections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (703) 308-1895. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



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*Richard Bueker*

Richard Bueker  
Primary Examiner  
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